ONTARIO MINISTRY OF ENVIRONMENT
36936000023215

1969

OPERATING SUMMARY

CONISTON

water pollution control plant

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ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

TD
367
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C665
1969

Coniston : water pollution
control plant.
81243

Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 195
Ontario

The operating efficiency and financial status of the water pollution control facilities operated for you in 1969 are presented in the following pages.

The regional operations engineer's comments and the statistical data will assist you in gauging the plant's level of performance. A new flow chart and up-to-date design data are also provided.

Various divisions and sections within the Commission have co-operated in providing what we trust is an accurate and concise annual operating summary.

DS Caverly

D.S. Caverly,
General Manager.

D McTavish

D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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CONISTON

water pollution control plant

operated for

THE TOWN OF CONISTON

by the

ONTARIO WATER RESOURCES COMMISSION

1969 ANNUAL OPERATING SUMMARY

ONTARIO WATER RESOURCES COMMISSION

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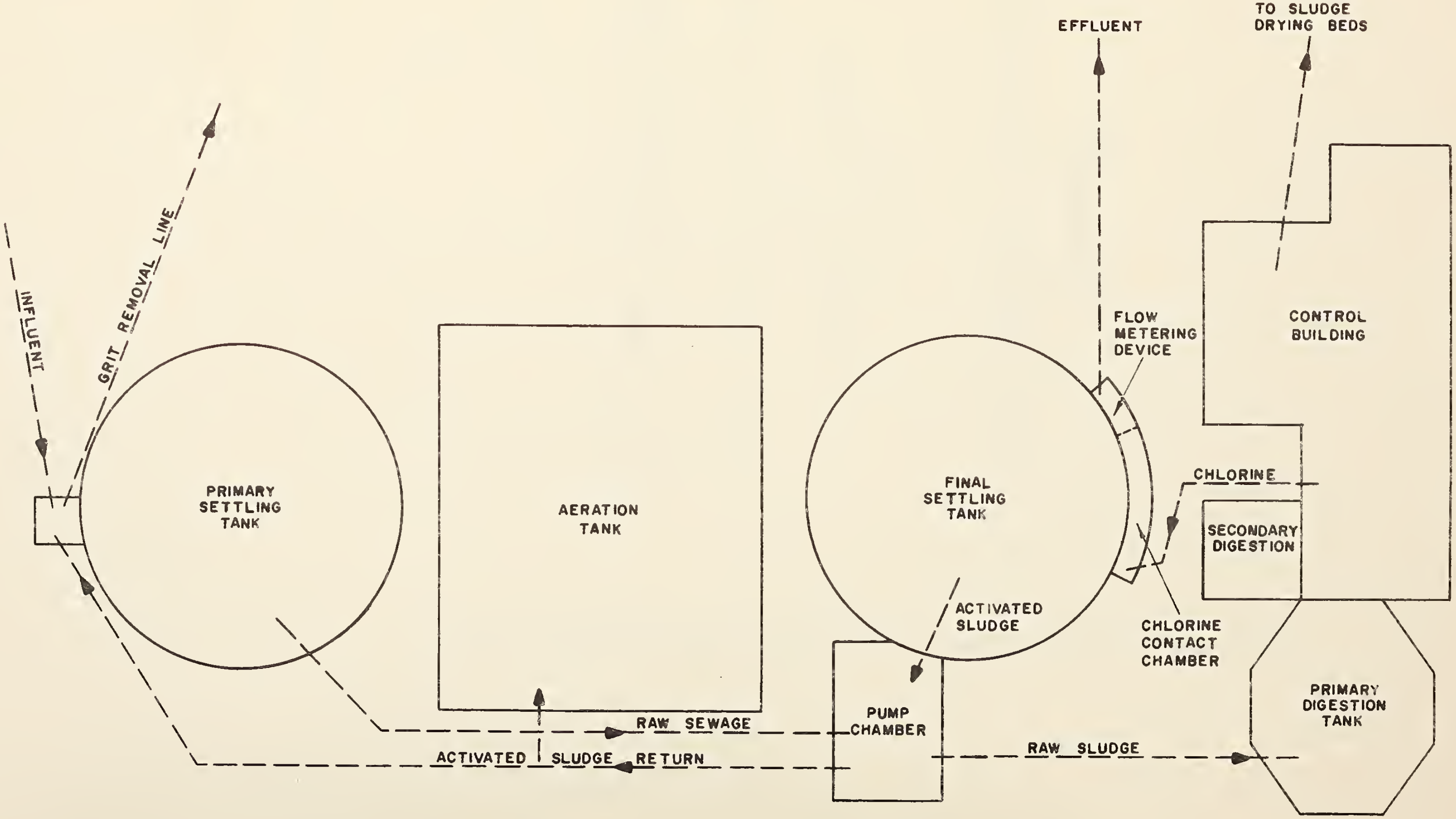
Assistant Director
C. W. Perry

Regional Supervisor
P. J. Osmond

Operations Engineer
R. Kauppinen

135 St. Clair Avenue West
Toronto 7

FLOW CHART


TO SLUDGE DRYING BEDS
EFFLUENT
INFLUENT
GRIT REMOVAL LINE
PRIMARY SETTLING TANK
AERATION TANK
FINAL SETTLING TANK
FLOW METERING DEVICE
CONTROL BUILDING
CHLORINE
SECONDARY DIGESTION
ACTIVATED SLUDGE
CHLORINE CONTACT CHAMBER
PRIMARY DIGESTION TANK
PUMP CHAMBER
RAW SEWAGE
ACTIVATED SLUDGE RETURN
RAW SLUDGE

DESIGN DATA

PROJECT NO.	2-0008-57	TREATMENT	Activated Sludge
DESIGN FLOW		DESIGN POPULATION	2,500
Primary	0.260 mgd		
Secondary	0.150 mgd		
BOD - Raw Sewage	200 mg/l	SS - Raw Sewage	250 mg/l
- Removal	93%	Removal	93%

PRIMARY TREATMENT

Screening & Grit Removal

- in influent chamber

Primary Sedimentation

Type: Neco with helical scraper
Size: One 24' dia x 5.7' (18,400 gal)
Retention: 2.94 hr
Loading: Surface, 332 gal/ft^2/day
(@ 0.26 mgd) Weir, 1.700 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical aeration, single-pass
Size: One 29' x 29' x 15$\frac{1}{2}$' (55,800 gal)
Retention: 8.9 hr

Aerator

Type: Ames-Crosta
Size: One 6' dia

Secondary Sedimentation

Type: Ames-Crosta Type F
Size: One 28' dia x 6$\frac{1}{2}$'
Retention: 4 hr
Loading: Surface, 572 gal/ft^2/day
(@ 0.15 mgd) Weir, 720 gal/ft/day

CHLORINATION

Type: W & T Type A678

Chlorine Contact Chamber

Retention: 10 min

OUTFALL

- 10" Transite to creek

SLUDGE HANDLING

Digestion System

Type: Two-stage

Primary --
One concrete fixed roof octagonal tank with 12" Ames-Crosta screw pump
Size: 19' 3" x 14' swd (4640 ft^3 or 29,000 gal)

Secondary --
One concrete tank with plank roof
Size: 10' x 10' x 8' swd (920 ft^3 or 5,700 gal)

Drying Beds

Six beds 20' x 30'

'69 REVIEW

GENERAL

The project consists of a 150,000-gallon-a-day secondary treatment plant and a collector system which includes five lift stations. The project was operated by a chief operator who was assisted by part-time help.

Flows to the plant exceeded design capacity, and steps were taken to expand the treatment facilities. After discussions and correspondence with the Town, the OWRC asked the Ontario Municipal Board, on behalf of the Town of Coniston, to expand the existing treatment facilities and improve the collector system. The request was based on a report prepared by Canadian Mitchell Associates Limited in 1968.

EXPENDITURES

The total operating cost for the year was $18,073.73 compared to $14,885.11 in 1968. The increase was mainly due to increased payroll costs and for sludge haulage.

The cost for each million gallons treated was $257.42 compared to $205.35 in 1968.

PLANT FLOWS and CHLORINATION

A total of 70.208 million gallons was treated in 1969. The average daily flow for the year was 194,000 gallons compared to 198,000 gallons in 1968. Approximately 75 percent of the time the daily flow exceeded the design flow for secondary treatment of 150,000 gallons per day.

The final effluent was chlorinated from June to October. A total of 2,020 pounds of chlorine was used for an average dosage of 9.9 mg/l.

PLANT EFFICIENCY

The raw sewage had an average concentration of 246 mg/l BOD and 188 mg/l suspended solids. The raw sewage had a high BOD reading in the September sample which increased the average BOD concentration for the year. The final effluent had an average concentration of 48 mg/l BOD and 68 mg/l suspended solids.

The average reduction in BOD was 74 percent and in suspended solids 61 percent, both of which are less than the reduction normally expected for secondary treatment.

The concentrations in the final effluent exceeded the OWRC objectives of 15 mg/l for both BOD and suspended solids for plants with secondary treatment.

A total of 675 cubic feet of grit was removed at an average of 9.2 cubic feet per million gallons treated.

AERATION

The average mixed liquor suspended solids concentration was 2,900 mg/l. The average concentration in the primary effluent was 194 mg/l BOD, resulting in an average loading on the aeration section of 25 pounds of BOD per 100 pounds of MLSS or an F/M ratio of 0.25

Since mechanical aeration is used at the plant, there is no direct means of measuring the air used. Tests taken regularly indicated that a satisfactory dissolved oxygen was maintained in the aeration.

SLUDGE DIGESTION and DISPOSAL

There are no flow measuring devices for measuring the volumes of raw sludge and digested sludge. The quantities are estimated.

An estimated 133,300 gallons of raw sludge was pumped to the digester. An estimated 160,700 gallons of digested sludge was removed from the digester. A total of 274 cubic yards of liquod digested sludge was removed by tank truck during the winter. A total of 228 cubic yards of dewatered sludge was removed from the drying beds.

During June and July the primary digester was emptied and the hot water piping and mixer were repaired.

CONCLUSIONS and RECOMMENDATIONS

The plant was overloaded in 1969. The flows exceeded the design capacity 75 percent of the time and the resulting quality of the final effluent did not meet the OWRC objectives for secondary treatment.

The present program to expand the treatment facilities and to improve the collector system should be continued.

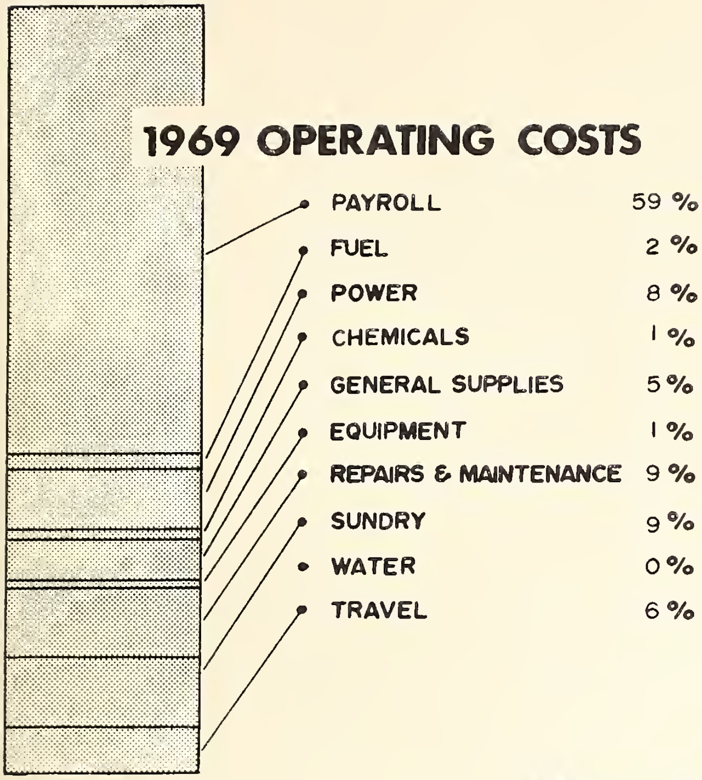
PROJECT COSTS

NET CAPITAL COST (Final) Long Term Debt to OWRC	$468,190.39
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1969	$125,360.38
Net Operating	$ 18,073.73
Debt Retirement	9,448.00
Reserve	2,664.00
Interest Charged	26,211.57
TOTAL	$ 56,397.30

RESERVE ACCOUNT

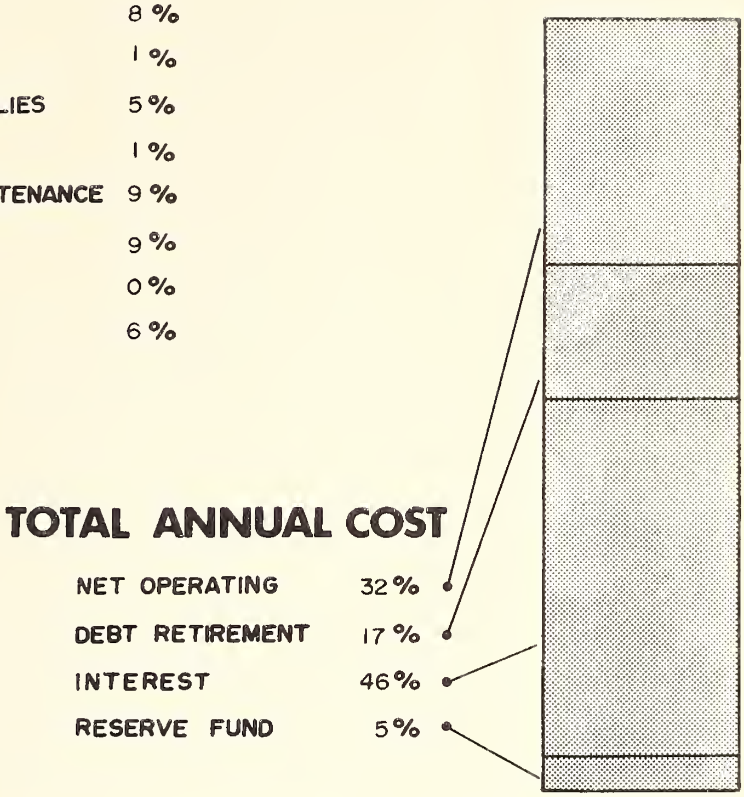
Balance @ January 1, 1969	$ 17,424.07
Deposited by Municipality	2,664.00
Interest Earned	1,047.68
	$ 21,135.75
Less Expenditures	-
Balance @ December 31, 1969	$ 21,135.75

* Not including interest penalty of $57.56



1969 OPERATING COSTS

PAYROLL	59 %
FUEL	2 %
POWER	8 %
CHEMICALS	1 %
GENERAL SUPPLIES	5 %
EQUIPMENT	1 %
REPAIRS & MAINTENANCE	9 %
SUNDRY	9 %
WATER	0 %
TRAVEL	6 %



TOTAL ANNUAL COST

NET OPERATING	32 %
DEBT RETIREMENT	17 %
INTEREST	46 %
RESERVE FUND	5 %

Yearly Operating Costs

YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1965	72.875	$12,495.59	$171.47	12 cents
1966	63.139	11,578.81	183.29	11 cents
1967	69.296	13,350.51	192.66	13 cents
1968	72.488	14,885.11	205.35	17 cents
1969	70.21	18,073.73	257.42	13 cents

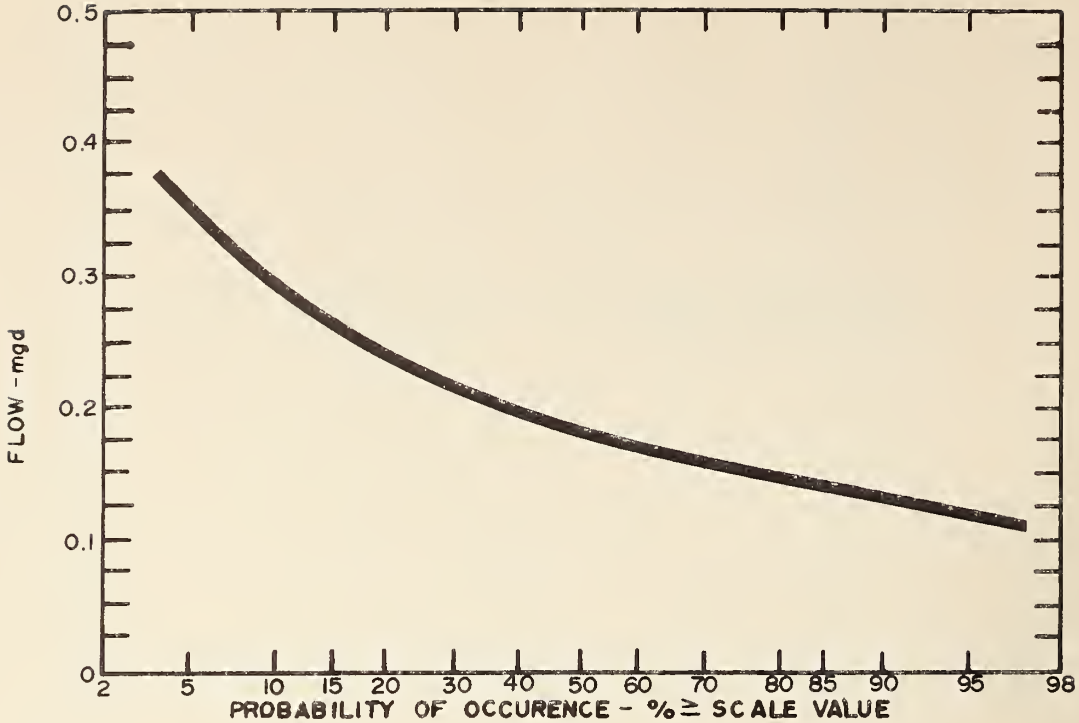
Monthly Operating Costs

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY *	WATER	TRAVEL
JAN	1236.54	852.69	142.39	32.08	135.21	-	-	-	-	18.17	-	56.00
FEB	1356.15	653.95	76.24	80.49	165.45	-	27.95	-	-	216.05	-	136.02
MAR	1518.80	591.25	193.29	34.52	130.95	-	27.20	-	180.78	289.29	-	71.52
APR	2010.72	823.25	130.67	67.11	150.66	-	42.83	-	158.00	558.68	-	79.52
MAY	1734.05	823.64	215.66	-	150.20	-	265.32	-	105.60	85.47	-	88.16
JUNE	1421.13	599.43	271.54	-	105.65	220.50	88.41	-	41.59	39.93	-	54.08
JULY	1212.12	577.91	311.36	-	86.17	-	64.78	97.66	-	-	-	74.24
AUG	1413.82	844.99	350.45	-	92.43	-	14.50	-	73.50	37.95	-	-
SEPT	2104.00	591.04	273.21	48.95	85.47	-	196.41	-	755.64	25.25	-	128.00
OCT	1433.81	567.08	268.36	-	86.40	48.67	13.20	-	290.74	-	-	159.36
NOV	876.80	570.78	86.82	-	101.39	-	16.70	-	-	65.31	-	35.80
DEC	1755.79	638.42	176.10	161.53	148.50	-	227.70	-	-	217.68	-	185.86
TOTAL	18073.73	8134.43	2496.09	424.68	143 .48	269.17	985.00	97.66	1605.88	1553.78	-	1068.56

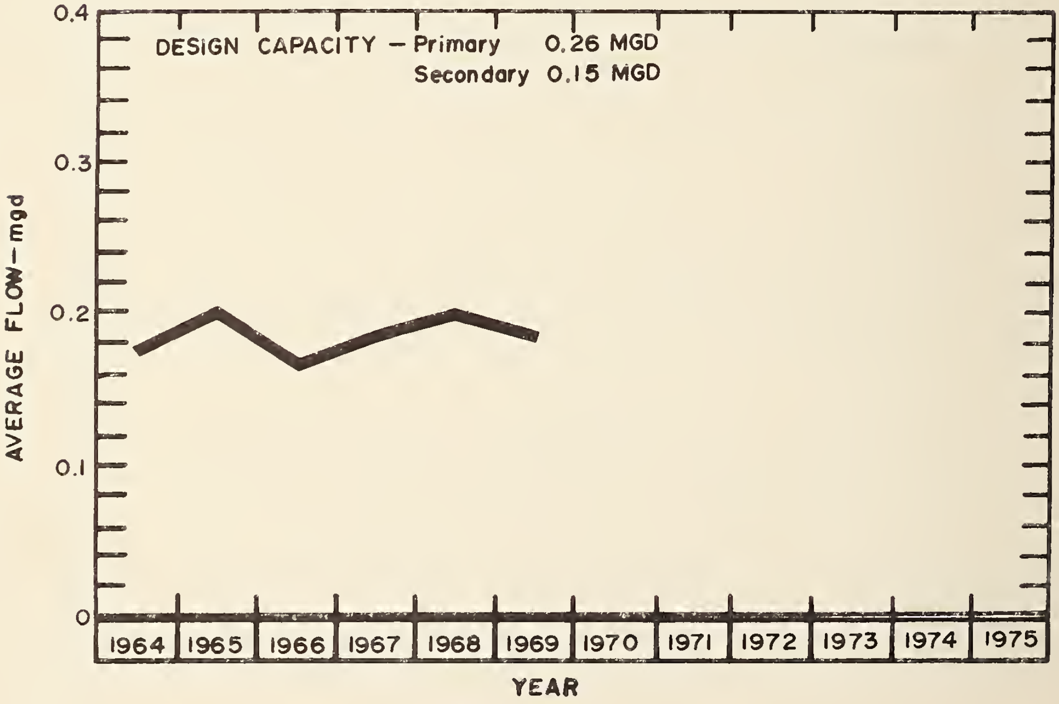
BRACKETS INDICATE CREDIT

* SUNDRY INCLUDES SLUDGE HAULAGE COSTS WHICH WERE $693.75

PROCESS DATA


0.5
0.4
0.3
0.2
0.1
0
FLOW - mgd
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
PROBABILITY OF OCCURENCE - % ≥ SCALE VALUE

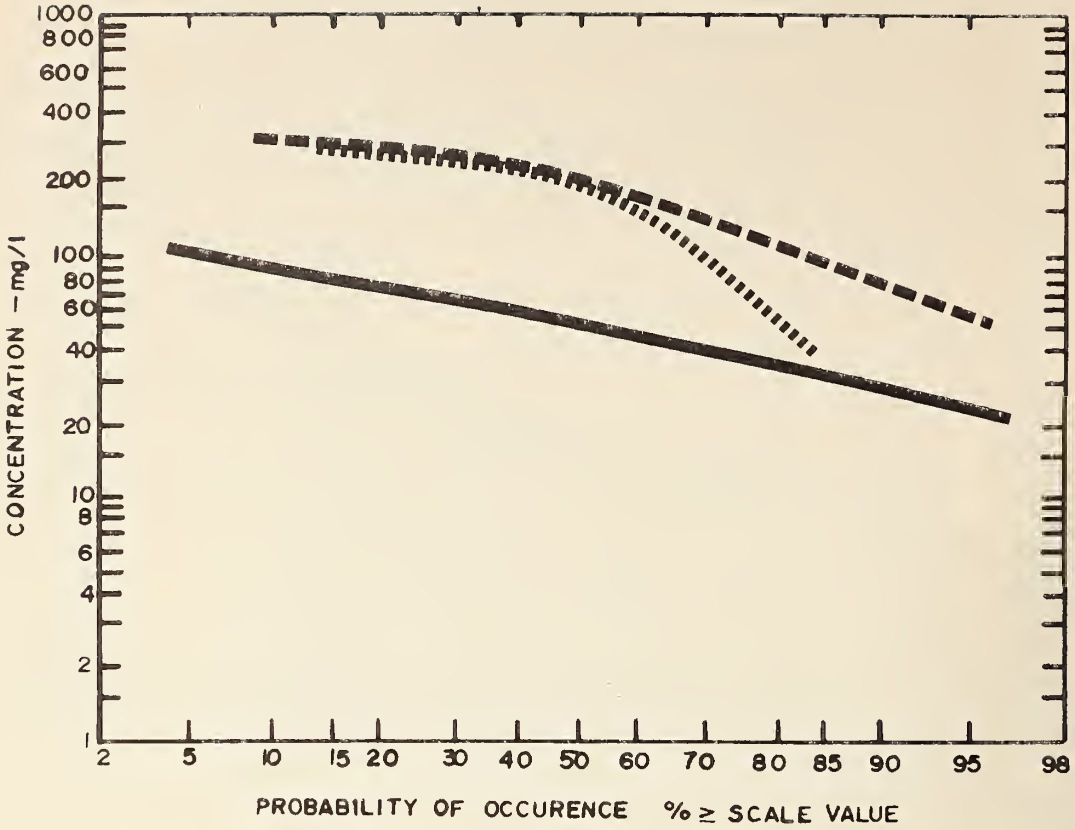
FLOWS


0.4
0.3
0.2
0.1
0
AVERAGE FLOW - mgd
DESIGN CAPACITY — Primary 0.26 MGD
Secondary 0.15 MGD
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
YEAR

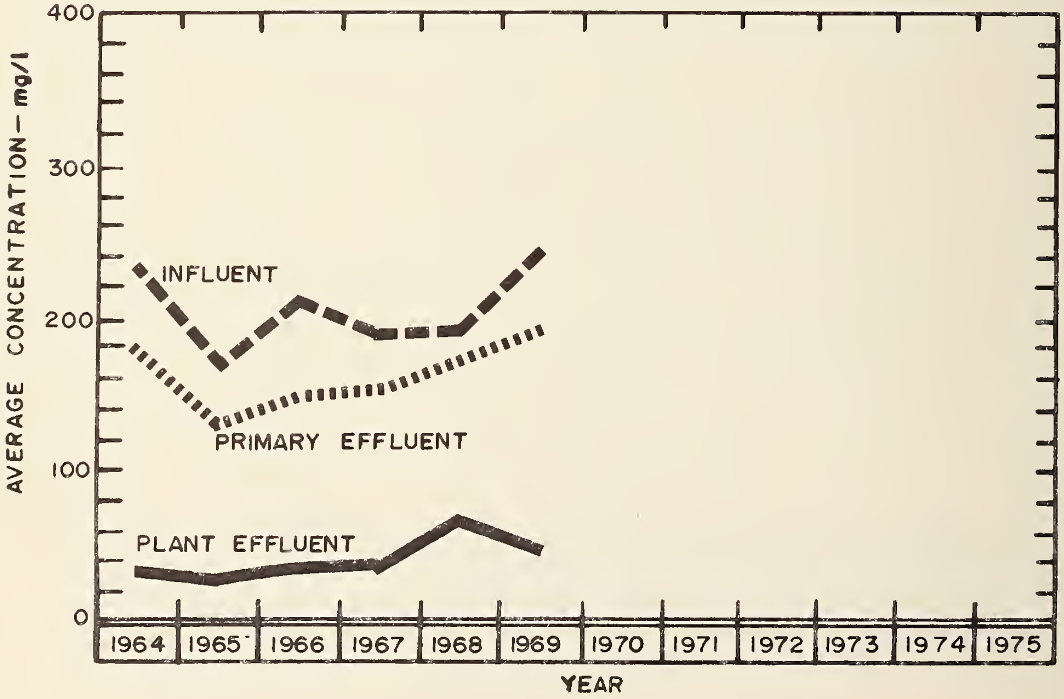
PLANT FLOWS and CHLORINATION

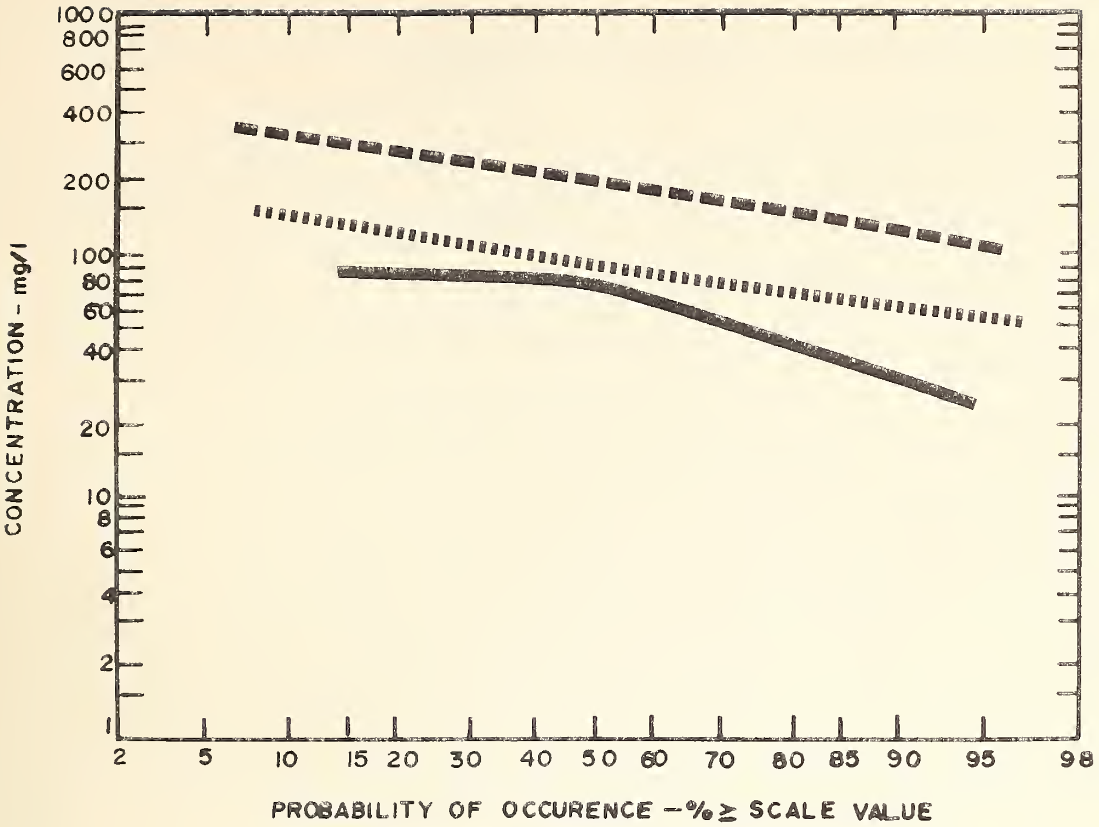
MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED pounds	DOSAGE mg/l
JAN	5.748	.185	.417	.094	0	0
FEB	5.397	.193	.218	.178	0	0
MAR	8.241	.267	.488	.185	0	0
APR	9.488	.316	.496	.222	0	0
MAY	6.769	.218	.310	.134	0	0
JUNE	5.097	.170	.243	.093	240	10.7
JULY	4.613	.149	.208	.073	505	10.9
AUG	4.769	.154	.183	.128	465	9.8
SEPT	3.995	.133	.154	.102	450	11.3
OCT	5.243	.169	.277	.082	360	6.9
NOV	7.724	.257	.449	.147	0	0
DEC	5.501	.204	.222	.100	0	0
TOTAL	70.208	-	-	-	2020	-
AVERAGE	-	.194	-	-	404	9.9

* Average dosage when chlorination practised.

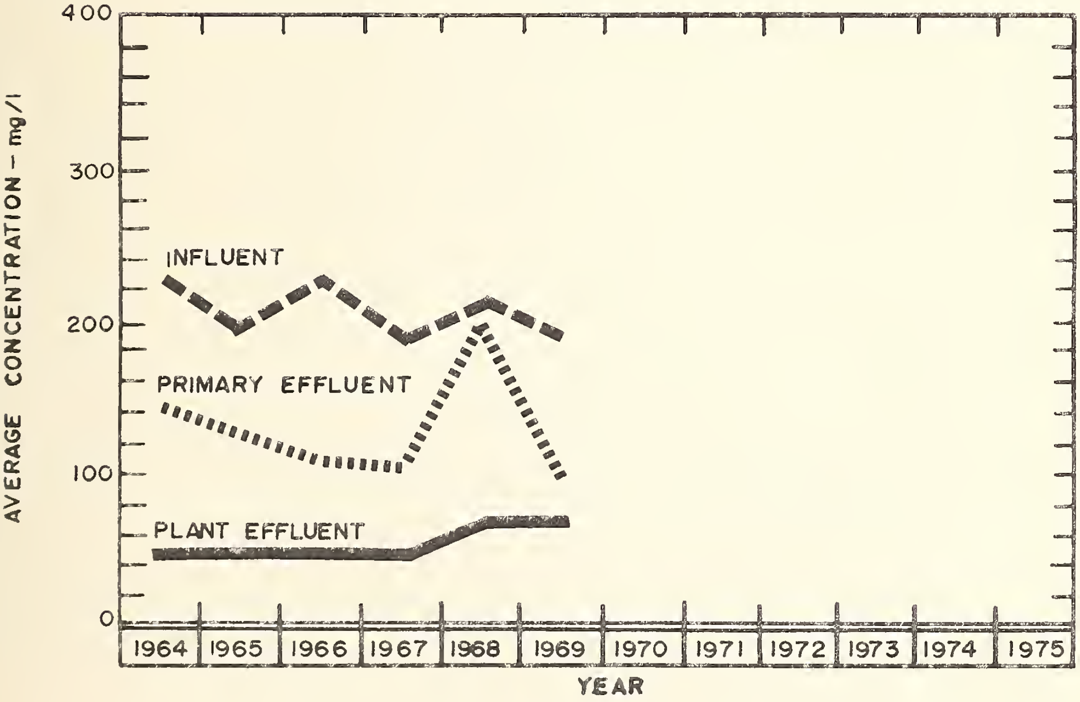


BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS

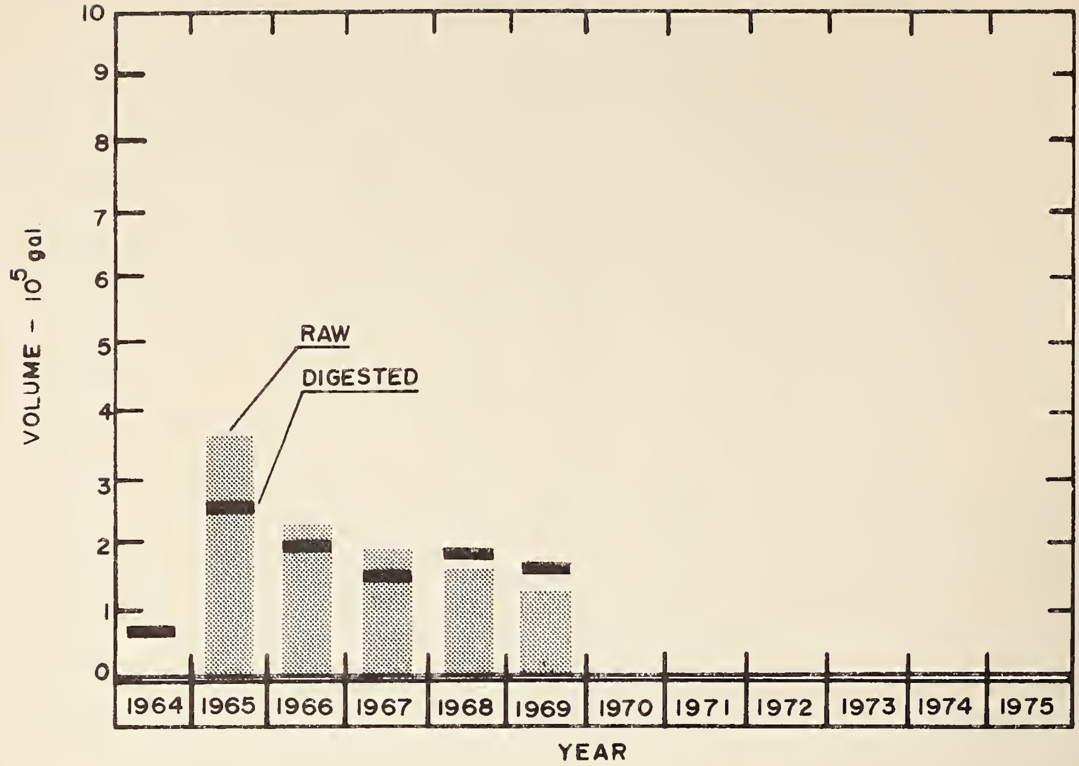


PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT REMOVAL cu ft
	INF. mg/l	EFF. mg/l	REDUCTION		INF. CONCN mg/l	EFF. CONCN mg/l	REDUCTION		
			%	10^3 pounds			%	10^3 pounds	
JAN	–	–	–	–	–	–	–	–	60
FEB	–	–	–	–	–	–	–	–	60
MAR	–	–	–	–	–	–	–	–	45
APR	140	42	70	9.3	210	80	62	12.3	60
MAY	90	36	60	3.7	90	50	45	2.7	45
JUNE	–	–	–	–	–	–	–	–	45
JULY	140	34	76	4.9	210	40	81	7.8	75
AUG	–	–	–	–	–	–	–	–	60
SEPT	600	70	88	21.2	260	90	65	6.8	75
OCT	260	60	77	10.5	170	80	53	4.7	60
NOV	–	–	–	–	–	–	–	–	30
DEC	–	–	–	–	–	–	–	–	60
TOTAL	–	–	–	–	–	–	–	–	675
AVERAGE	246	48	74	9.9	188	68	61	6.4	56

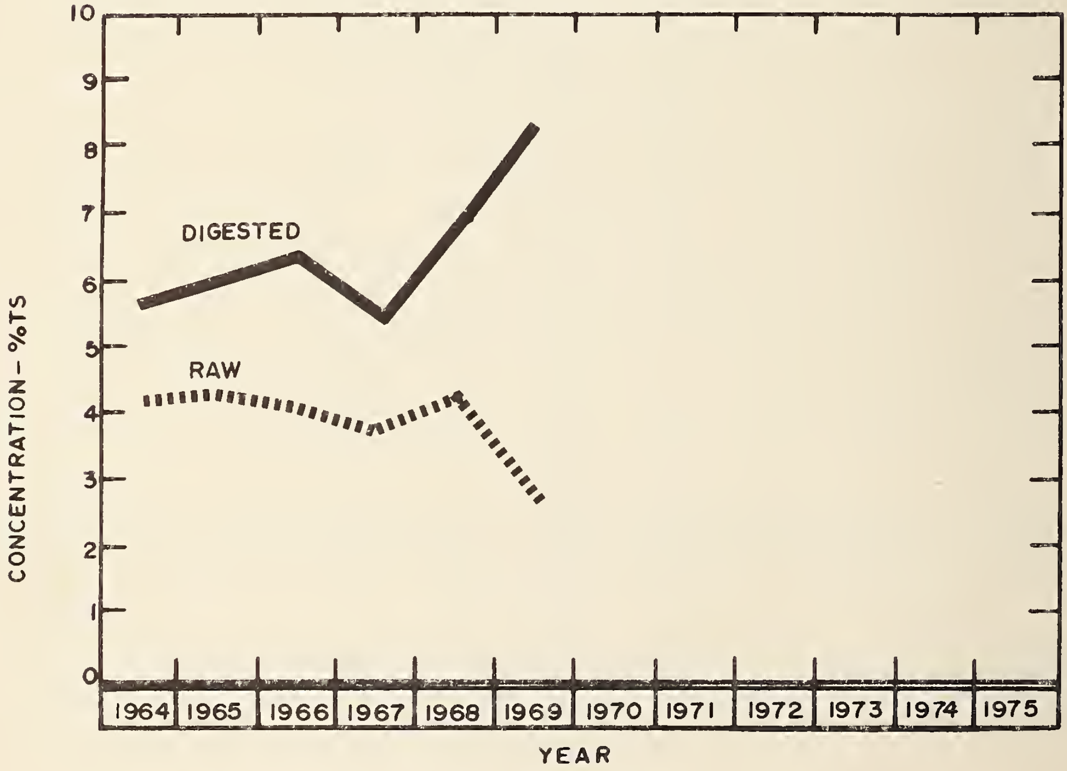
AERATION

MONTH	AVG DAILY FLOW mil gal	AERATION INF.		SECONDY. EFF.		M L S S CONCN mg/l	F/M lb B O D / lb MLSS	AIR USED 1000 cu ft / lb B O D	WASTE SLUDGE lb/DAY
		B O D mg/l	S S CONCN mg/l	B O D mg/l	S S CONCN mg/l				
JAN	.185	–	–	–	–	–	–	–	–
FEB	.193	–	–	–	–	–	–	–	–
MAR	.267	–	–	–	–	–	–	–	–
APR	.316	85	100	42	80	–	–	–	–
MAY	.218	70	90	36	50	3240	.08	–	–
JUNE	.170	–	–	–	–	–	–	–	–
JULY	.140	–	90	34	40	–	–	–	–
AUG	.154	–	–	–	–	–	–	–	–
SEPT	.133	400	90	70	90	2000	.48	–	–
OCT	.169	220	120	60	80	3600	.19	–	–
NOV	.257	–	–	–	–	2760	–	–	–
DEC	.204	–	–	–	–	–	–	–	–
TOTAL	–	–	–	–	–	–	–	–	–
AVERAGE	.194	194	98	48	68	2900	.25	–	–



VOLUME - 10^5 gal
10
9
8
7
6
5
4
3
2
1
0
RAW
DIGESTED
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
YEAR

DIGESTION



CONCENTRATION - %TS
10
9
8
7
6
5
4
3
2
1
0
DIGESTED
RAW
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
YEAR

SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME 10^3 gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10^3 gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10^3 gal	TOTAL SOLIDS %	DEWATERED cu yd	LIQUID cu yd
JAN	14.1	-	-	27.3	-	-	-	-	0	132
FEB	4.3	-	-	7.4	-	-	-	-	0	43
MAR	10.0	-	-	23.3	-	-	-	-	-	99
APR	12.0	2.8	-	20.0	8.3	-	-	-	-	-
MAY	10.5	-	-	11.7	-	-	-	-	-	-
JUNE	14.6	-	-	4.0	-	-	-	-	38	-
JULY	13.2	-	-	4.0	-	-	-	-	190	-
AUG	11.0	-	-	14.0	-	-	-	-	-	-
SEPT	12.1	-	-	14.0	-	-	-	-	-	-
OCT	10.3	-	-	10.0	-	-	-	-	-	-
NOV	9.8	-	-	10.0	-	-	-	-	-	-
DEC	11.4	-	-	15.0	-	-	-	-	-	-
TOTAL	133.3	-	-	160.7	-	-	-	-	228	274
AVERAGE	11.1	2.8	-	13.4	8.3	-	-	-	-	-

Date Due

TD
367
.A56
C665
1969

Coniston : water pollution
control plant.

81243

Environment Ontario
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Canada

Water management in Ontario